

Progress Report
Corrective Measures Study (CMS) for Potential Release Site (PRS) 16-021(c)
October, November, December 1998

This memorandum summarizes Los Alamos National Laboratory (LANL) activities that were completed during the first quarter of FY 1999 on the CMS for PRS 16-021(c), the 260 outfall. Both the activities explicitly described in the CMS plan submitted to NMED on 9/30/99 and related activities are described.

LANL recognizes the importance of recent analytical results obtained from regional borehole R-25 for the PRS 16-021(c) CMS. Therefore LANL will schedule a meeting with New Mexico Environment Department representatives to discuss how to integrate results obtained through the LANL Hydrogeologic Workplan with the CMS process.

LANL also would like to discuss the frequency and format of progress reports that will be provided as part of the CMS. This document is an example of a moderate-level of detail that could be provided on a quarterly basis.

RCRA Facility Investigation (RFI) Report & CMS Plan – The RFI report and CMS plan were submitted to the Administrative Authority (AA) during September 1998. Backup reference materials were provided during October 1998. Both documents are currently under review by the AA. A meeting with AA representatives (Kim Hill and John Young) to discuss issues associated with the RFI report and CMS plan was held on December 3, 1998. Discussions at this meeting were used to modify planned quarterly hydrologic sampling that occurred during December 1998. LANL added additional samples to the quarterly sampling in December, including samples in upper Canon de Valle, the 90s Line Pond, and the Canon de Valle/Water Canyon confluence. LANL also added extended HE and uranium analytical suites to that quarterly sampling.

Best Management Practices (BMPs) – Several new BMPs were implemented at PRS 16-021(c) during October 1998. These included (1) a water diversion pipe from the outfall trough down to Canon de Valle, (2) plastic sheeting over the outfall trough, and (3) a permanent concrete diversion dam upgradient from the PRS on the northeast side of the access road behind building TA-16-260. Existing BMPs were inspected and repaired. All of these BMPs are designed to further minimize run-on and runoff from the contaminated outfall area.

CMS Hydrogeologic Investigations – CMS hydrologic investigations include both continuation of ongoing Phase II RFI sampling and initiation of investigations outlined in the CMS plan. Continued Phase II RFI sampling included daily sampling of SWSC, Burning Ground, and Martin Springs for bromide and other anions. No additional bromide breakthrough was observed in any spring. Wells, both alluvial and deep, were checked weekly for water level/presence of water. All five alluvial wells contained water. One intermediate-depth borehole, 16-2712, which is located in the outfall area, also contained water. All three springs, four alluvial wells (one alluvial well was frozen), the

saturated intermediate-depth borehole, and Peter Seep were all sampled during quarterly sampling in December 1998.

CMS hydrologic investigations included completion of a stream profile in Canon de Valle as outlined in subsection 6.4 of the CMS plan. Temperature, pH, and stream flow were measured at 14 locations in Canon de Valle. Stable isotope investigations, as outlined in subsection 6.2 of the CMS plan were initiated. All of the springs, alluvial wells, and surface water sampling locations were sampled for stable isotopes of oxygen and hydrogen. A subset of these locations was also sampled for nitrogen isotopes. Additional stable isotope sampling locations, selected following discussion with AA on December 3, 1998, included the headwaters of Canon de Valle, the confluence of Water Canyon/Canon de Valle, and the 90s Line Pond. Analyte suites for quarterly sampling were expanded to include uranium and extended HE (including nitroglycerine).

Regional well R-25 continued to be drilled downgradient from PRS 16-021(c) during the first quarter of FY 99. HE results from R-25 suggest connectivity from PRS 16-021(c) to deep (> 700 ft) perched and regional aquifers. These results strongly affect the potential scope of the PRS 16-021(c) hydrogeology studies and the scope of the PRS 16-021(c) CMS.

Ecological Risk Pilot - A meeting was held on November 24, 1998 with NMED and EPA to discuss the ecological screening assessment and to start work on problem formulation for the Cañon de Valle Baseline Ecological Risk Assessment. The purpose of the assessment was discussed and agreed to as “Determine the potential ranges of adverse ecological impacts to assessment endpoints, so that the risk managers can evaluate the significance of these impacts.” The meeting also addressed the scale of the assessment, working assumptions, focusing the assessment on the aquatic and riparian systems, and the conceptual model. Work is underway to develop toxicity reference values for the COPECs. Once these values are developed and accepted by NMED, the problem formulation will continue.

CMS Bench and Pilot Studies – Bench and Pilot studies continued in collaboration with the Innovative Treatment Remediation Demonstration (ITRD) program. The ITRD HE project is focused on two Department of Energy sites – LANL and Pantex. A meeting of ITRD participants was held during October 1998, and a conference call to discuss results of Bench and Pilot studies was held during December 1998. Four studies are ongoing under the auspices of ITRD, all of which may benefit the PRS 16-021 (c) CMS: (1) A study of the passive barrier technology of Stormwater Management Inc., which is potentially useful for removing HE and barium from waters. This study is being completed using water from Canon de Valle. (2) A study of chemical treatment of HE-contaminated soil using zero-valent iron (ZVI). This is being completed by the University of Nebraska using PRS 16-021(c) soil. This soil was taken from a moderately contaminated location within PRS 16-021(c) and does not constitute a RCRA regulated hazardous waste, based on laboratory analysis. (3) A study of anaerobic in-situ bioremediation of HE using gas-phase carbon additions. This study is being completed by

Idaho National Engineering and Environment Laboratory (INEEL) and Texas Tech University using Pantex soil and a Pantex field site. (4) A study of ex-situ anaerobic bioremediation of Pantex soils using the W.R. Grace process, which combines anaerobic bioremediation with a ZVI treatment.

Stormwater Management Inc. treated Canon De Valle waters using a granular activated carbon (GAC) filter, using their proprietary leaf media, and using surface-modified zeolite. The best removal efficiency for RDX was with granular activated carbon (GAC), where the maximum percent removed was 68.4% (from 190 ug/l to 60 ug/l). Barium removal was poor for all three media, with a maximum of 21.7% using GAC. Future studies will attempt longer flow times and a Ba-specific resin.

Zero-valent iron (ZVI) studies of soil remediation have shown decreases in RDX (from > 2000 mg/kg to > 500 mg/kg) in 60 days of treatment with ZVI + acetate. However, control samples (water only) have decreased in concentration almost as much as those treated with ZVI. These samples show higher than neutral pHs (> 8), so base hydrolysis may also be occurring. Further samples will be provided to the University of Nebraska to resolve these issues.

The in-situ bioremediation study has two foci: (1) laboratory-scale tests to determine an optimum carbon addition for gas-phase bioremediation, and (2) development of a Pantex field-based pilot site for implementation of this technology. The laboratory-scale tests are providing equivocal results. The controls are soil columns subjected to nitrogen carrier gas. The treatments combine simple organic gases with the nitrogen carrier gas. The rates of decrease in RDX for the control columns are not different from the treatment columns. The field-based pilot has drilled several shallow boreholes to look for a good location for a pilot test.

Analytical results have not been received from W.R. Grace for the ex-situ bioremediation study of Pantex soils.

Interim Measure – Planning for the interim measure begun. A treatment train for different waste types anticipated in the outfall area was developed.